

ACADEMIC ACHIEVEMENT PREDICTION MODEL
USING NEURAL NETWORKS

A thesis submitted to the Graduate School in partial
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by
Normaziah Binti Abdul Rahman



**Sekolah Siswazah
(Graduate School)
Universiti Utara Malaysia**

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Nama Penyelia
(Name of Supervisor) : Prof. Madya Fadzilah Siraj

Tandatangan
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: Fadzilah
FADZILAH SIRAJ
Associate Professor
School of Information Technology
Universiti Utara Malaysia

Tarikh
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ABSTRACT (BAHASA MELAYU)

Kajian ini bertujuan untuk membangunkan model ramalan pencapaian akademik(ACP) berasaskan rangkaian neural. Ia mampu untuk meramalkan keputusan peperiksaan pelajar bagi kursus Pengaturcaraan I (Bahasa C) di Kolej Agama Sultan Zainal Abidin (KUSZA), Kuala Terengganu. Model ini membenarkan pentadbir sistem untuk melatih dan menormalisasi data. Setelah model ini telah dilatih dan disahkan oleh pentadbir sistem ini, pencapaian pelajar boleh diramalkan pada masa depan. Model ini boleh meramalkan keputusan kursus pengaturcaraan I berdasarkan latarbelakang pendidikan pelajar semasa peperiksaan Sijil Pelajaran Malaysia (SPM).

Penyelesaian berasaskan rangkaian neural dengan menggunakan *Multi Layer Perceptron* (MLP) dan algoritma rambatan balik telah digunakan di dalam pembangunan model ini. Sejumlah 248 sampel data telah dikutip daripada pelajar Diploma Teknologi Maklumat dan Multimedia dan sampel ini telah dilatih dan diuji menggunakan model ini. Ketepatan ramalan bagi latihan sebanyak 90% dan ujian sebanyak 83.33% telah dicapai menggunakan model ini.

Analisa data menunjukkan terdapat hubung-kait antara pembolehubah input, yang mana ia terdiri daripada umur, jantina, lokasi sekolah, aliran pelajaran dan keputusan untuk matapelajaran tertentu iaitu English, matematik, Sains, Fizik dan Matematik Tambahan, dengan pembolehubah output. Keputusan juga menunjukkan rangkaian neural mempunyai potensi di dalam bidang pendidikan.

ABSTRACT (ENGLISH)

This study aims to develop the academic achievement prediction (ACP) model using Neural Networks. It is capable of predicting the student's result in Programming I (C Language) subject for Kolej Agama Sultan Zainal Abidin, Kuala Terengganu. This model allows the system administrator to train and normalize data as well as trains. Once the model has been established by the administrator, the future student achievement can be forecast by the model. The system can predict the result of Programming I subject based on the student 's background during the Sijil Pelajaran Malaysia (SPM) examination.

A neural network technique, using Multi Layer Perceptron (MLP) and back propagation algorithm was employed. A total of 248 data samples from Information Technology and Multimedia Diploma students were collected, trained and tested using this model. A training prediction of 90 % accuracy and testing prediction of 83.33% accuracy were achieved using this model.

The analysis of the data shows a reasonably strong correlation between the input variables, which consist of age, gender, school location, subject stream and result for a certain subjects: English, Mathematics, Science, Physics and Additional Mathematics, with the targeted output variable. The results also indicate that neural network has a potential to be used for education planning.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

As technology continuously progresses, methodologies evolve to enhance our abilities to perform arduous tasks more expediently. Utilizing modern computing technologies not only makes completing tasks more efficient, but also often achieves a higher degree of accuracy than do humans. Neural network has emerged as a very popular area of research, both from the design and the usage points of view. There is considerable research emphasis on designing better and more efficient neural networks, more powerful "learning algorithms", better transfer functions. On the other hand, there is a great amount of academic interest in the applications of neural networks. In addition, there is a significant volume of research on neural networks in the engineering and science literature. There also exists a reasonable body of neural network research as related to business.

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